# Attachment J1
# Table of Contents

**J1 SOLDIER SYSTEMS CENTER....1**

**J1.1 Overview....1**

**J1.2 Existing Electrical Distribution System Description....1**
J1.2.1 Inventory....3
J1.2.2 Non-Fixed Equipment and Specialized Tools Inventory....4
J1.2.3 Manuals, Drawings, and Records Inventory....4

**J1.3 Proposed System Improvements....4**

**J1.4 Current Service Arrangement....5**

**J1.5 Secondary Metering....6**
J1.5.1 Existing and Future Secondary Meters....6

**J1.6 Submittals....6**

**J1.7 Service Area....7**

**J1.8 Points of Demarcation....7**

## List of Tables

**FIXED INVENTORY**---- 3
**SPARE PARTS**---- 4
**SPECIALIZED EQUIPMENT AND VEHICLES** ---- 4
**MANUALS, DRAWINGS, AND RECORDS** ---- 4
**FUTURE SECONDARY METERS**---- 6

# J1 Soldier Systems Center

## J1.1 Overview

The U.S. Army Soldier Systems Center (SSC, the Center, or the Installation), Natick, Massachusetts is a compact military installation situated on approximately 78 acres located on the eastern shore of Lake Cochituate, approximately 17 miles west of Boston, adjacent to the town of Natick, Massachusetts. The Center provides support to various DoD organizations conducting research, development and testing activities to assure acceptable equipment and technologies for U. S. Army personnel.

SSC's physical plant at the Main Installation includes roughly 100 buildings and/or structures including a Headquarters Building, Climatic Research and Testing Laboratories, barracks, and various technological support facilities. In total, the physical plant located within the Main Installation covers approximately 786,216 square feet (SF). Electrical distribution service is provided to approximately 40 buildings covering an estimated 782,000 SF (roughly 99.5 percent of total building square footage).

## J1.2 Existing Electrical Distribution System Description

The following is provided only to give an approximation of the size, scope and general description of the Center's existing electrical distribution system. Any use of the numbers included herein may be used for estimating purpose only.

Construction of the electrical distribution system began in the early to mid 1950's. The electrical system exhibits the design and construction practices of that era. The system is basically a 13.8 kV radial distribution network (fed by two separate feeders) with step down transformer stations installed at scattered load centers. The original mode of overhead power line construction gave way to underground power cable feeder installations; now there is only one area of overhead power circuit facilities.

Based upon review and analysis of electrical system maps provided by the Installation, and supplemented by random field observation, the Government-owned system contains the following:

- One 13.8 kV distribution substation;
- 1.0 circuit-miles of overhead primary and secondary distribution line; and
- 3.2 circuit-miles of underground primary and secondary distribution line.

The Main Substation (Station 328) is located on the north side of 'A' Street at the intersection of First Avenue, within the Main Installation. The substation is owned and operated jointly by the U. S. Army and NSTAR Electric. The substation, sometimes referred to as the Switching Station, consists of nine (9) 13.8 kV cubicles, with a single common 13.8 kV Bus (600 A), and a large testing cubicle. Additionally SSC owns a power factor correction unit consisting of three 450 KVAR capacitor banks for power factor control. The Army receives electrical power service from two NSTAR Electric Company (NSTAR, NSTAR Electric or the Electric Company) 13.8 kV feeders. NSTAR owns, operates and maintains the two incoming feeder breakers and one metering-equipment cubicle in the Main Substation; the Army owns, operates and maintains the other six (6) cubicles consisting of four breakers, HV fusing and one spare cubicle. SSC and NSTAR jointly own, operate and maintain the testing cubicle.

The Main Substation is essentially a 13.8 kV switching station. The substation was constructed in approximately 1950. The Installation's distribution portion of the substation contains a lineup of

Westinghouse 15 kV rated oil-filled circuit breakers (Type B-28-B). One NSTAR incoming feeder originates at the Mechanic Street substation in Natick and is an overhead-insulated cable circuit that terminates at NSTAR (formerly Boston Edison Company – BECO) Pole No. 20 continues underground and is routed via Manhole No. 2 into the substation. The other NSTAR incoming feeder originates at the Leland Street substation in Framingham and is installed as submarine cable under Lake Cochituate and is routed via Manhole No. 2 into the Main Substation.

The Center's 13.8 kV distribution system that originates in the Main Substation contains two 13.8 kV radial feeders. The two feeders exit the substation via underground cables and are routed under 'A' Street to a riser structure located on the northwest corner of First Avenue. Feeders Nos.1 and 2 make the transition from underground (UG) to overhead (OH) configuration at this structure. The structure consists of four wood poles with a working platform, support bracing and fuse disconnects. Each of the two OH feeders are #2/0 AWG, three phase, XLP insulated copper conductors. Feeders Nos.1 and 2 are installed on double circuit, single wood pole structures for a distance of approximately 900 feet parallel to First Avenue, before making a transition to UG configuration for the remainder of their lengths. The wood pole structures and circuits are around the 1955 to 1962 era. The condition of the OH circuits is poor to fair due to the age and exposure conditions. Concrete caps have been installed around the ground-line of the wood poles for protection from vehicle traffic along First Avenue. The poles and associated wooden support structures for the aerial cabling are in a failed and failing state.

Aerial taps were made to the two insulated OH feeders to serve various loads along the route. Feeder No. 1 serves the central portion of the complex while Feeder No. 2 serves loads in the northern, central and southern portions of the cantonment complex. Feeder No. 2 serves two 13.8 kV/ 2400V transformer loads. One is located in Building No.19 for Boiler House loads and one is located in Building No. 2 for the Climatic Laboratory loads. Note: The 13.8kv/2400V transformer in Bldg 19 is still in place, however all load has been removed from it, and it is no longer in service. As part of the demolition, this transformer shall be removed, with no need for a 2400V replacement. The only 2400V load remaining shall be in Bldg 2.

Practically all of the remaining distribution system is UG cable feeders (installed in concrete duct banks), pad-mounted transformers (interior and exterior) and switches (circa 1970's). The conductor sizes of the main UG feeder radials are 3/C three phase #2/0 and #3/0 XLP or rubber insulated cables. The two UG distribution feeders are not interconnected and do not provide loop circuit reliability. There are two 13.8 kV oil-filled switches installed in the UG portion of the distribution network (one G&W, Type RAL-M located in Building No. 1 and one ESCO, Type LAK located in Building No. 45). Service load transformations are from 13.8 kV: 120/208V, 13.8 kV: 480V, and 13.8 kV: 2400V. There are 27 pad-mounted transformers located outdoors or inside buildings near service loads. All transformers have been certified as being non PCB contaminated. The two oil-filled switches have not been tested.

The reliability of SSC's electrical distribution system may be categorized as poor. Although the system has relatively few outages, when an outage does occur it results in excessive downtime due to the lack of alternate (loop) feed and sectionalizing capability. Major portions of the Main Installation may be without power until the trouble can be located and corrective maintenance performed. Two recorded outages were attributed to rodents gnawing through cable insulation and resulting in cable faults.

One 13.8 kV circuit breaker cubicle in the Main Substation is dedicated for Station Service and the Installation's former 2400V direct-burial series street lighting system. The street lighting transformers have been removed, and the system is considered abandoned in place. No additional demolition/new construction is needed for the street lighting system.

## J1.2.1 Inventory

The Center's 13.8kv electrical distribution system includes approximately 5,242 linear feet (1.0 miles) of OH distribution line and 17,130 linear feet (3.2 miles) of UG distribution line; 27 pad-mounted type transformers; 2 oil-filled switches, an estimated 27 electrical services located within the Installation; and a 1350KVAR power factor correction unit.

**Table 1** provides a general listing of the major electrical system fixed assets for the SSC electrical distribution system included in the potential privatization action. The system will be sold in a "as is, where is" condition without any warranty, representation or obligation on the part of government to make any alterations, repairs, or improvements. Ancillary equipment attached to, and necessary for operating the system, though not specifically mentioned herein, is considered part of the purchased utility**.**

**TABLE 1**
**FIXED INVENTORY**

| Item | Quantity | Unit | Age (Years) |
|---|---|---|---|
| **Overhead Lines** | | | |
| 3 Phase - Insulated Wire - Small | 0.316 | Miles | 34 |
| Secondary | 0.079 | Miles | 34 |
| **Underground Lines** | | | |
| 3 Phase - Small | 0.865 | Miles | 34 |
| U/G Cable Duct Bank | 1.080 | Miles | 34 |
| Sectionalizing Switches | 25 | Each | 34 |
| Secondary | 0.216 | Miles | 34 |
| **Transformers - Pad Mounted** | | | |
| 3-Phase - 112.5 kVA & smaller | 1 | Each | 12 |
| 3-Phase - 150 kVA | 2 | Each | 26 |
| 3-Phase - 225 kVA | 5 | Each | 15 |
| 3-Phase - 300 kVA | 5 | Each | 15 |
| 3-Phase - 500 kVA | 3 | Each | 22 |
| 3-Phase - 750 kVA | 5 | Each | 16 |
| 3-Phase - 1000 kVA | 4 | Each | 13 |
| 3-Phase - 1500 kVA | 1 | Each | 12 |
| 3-Phase - 2500 kVA | 1 | Each | 8 |
| Subtotal | 27 | Each | 16 |
| **Services** | | | |
| 3 Phase | 27 | Each | 24 |
| **Substations** | | | |

| | | | |
|---|---|---|---|
| Unit Sub./ Buswork | 1 | Lot | 44 |
| Circuit Breakers / Switches | 5 | Each | 44 |
| 1350 KVAR Power Factor Correction Unit | 1 | Lot | 14 |

### J1.2.2 Non-Fixed Equipment and Specialized Tools Inventory

**Table 2** lists other ancillary equipment (spare parts) and **Table 3** lists specialized vehicles and tools included in the purchase. Offerors shall field verify all equipment and tools prior to submitting a bid. Offerors shall make their own determination of the adequacy of all equipment and tools. The successful Offeror shall provide any and all equipment, vehicles, and tools, whether included in the purchase or not, to maintain a fully operating system under the terms of this contract.

**TABLE 2**
**SPARE PARTS**

| Qty | Item | Make/Model | Description | Remarks |
|---|---|---|---|---|
| None | | | | |

**TABLE 3**
**SPECIALIZED EQUIPMENT AND VEHICLES**

| Description | Quantity | Location | Maker |
|---|---|---|---|
| None | | | |

### J1.2.3 Manuals, Drawings, and Records Inventory

**Table 4** lists the manuals, drawings, and records that will be transferred with the system.

**TABLE 4**
**MANUALS, DRAWINGS, AND RECORDS**

| Qty | Item | Description | Remarks |
|---|---|---|---|
| 1 | Drawing | Main Power One-Line Diagram, Dwg. No. SK-40-79, 6 May 98 | |
| 1 | Drawing | General Electrical Map (untitled), 12/10/03 | |
| 1 | Drawing | Power Factor Upgrade, Dwg. No. 813-50-01, 2/24/92 | |

## J1.3 Proposed System Improvements

Within 24 months of contract award, the successful offeror shall be responsible for the design (subject to review and coordination with SSC) and phased construction of the necessary electrical distribution components to provide the Installation with a new electrical distribution system, consistent with national and local electrical distribution utility standards. The electrical distribution system improvements shall allow all the buildings located within the Installation boundaries to be served from an alternate feeder in the event of a fault along any section of the high voltage (13.8kV) distribution on the Installation. Although this redundancy requirement may be met through either a “looped” or “dual feed” configuration, the Center is interested in the most cost effective means to meet the redundancy requirement.

All existing overhead distribution shall be removed, and replaced with the new distribution system placed underground and all underground electrical power cables shall be replaced. The successful offerer will also be responsible for coordinating the relocation of the non-power aerial cables (telecommunications, fire, security, etc) currently co-located on utility poles, from OH to UG. The design and construction of the duct system will be of sufficient capacity to accommodate the relocated non-power cables. Upon completion, all existing aerial cabling and structures shall be completely removed. During construction, the existing system shall remain fully operational until such time as any "cut-over" to new system is required. "Cut-over" to the new system shall be conducted only during weekend hours. A maximum electrical system "down time" for any "cut-over" shall not exceed a weekend (Friday 6pm-Monday 6am) at any given time. Note: A maximum of 5 buildings may be without power during any given outage. Outage schedule needs to be coordinated with the US Army. The successful offeror will also be responsible for the complete demolition, removal and disposal (off-site) of the Government-owned OH poles, cables, wires and attachments as well as all the existing high voltage transformers, switchgear and power cables located within the Installation's existing buildings and structures. The offeror shall also take ownership of the Main Electrical Substation, as well as the Power Factor Correction Unit.

The design of the new electrical distribution will incorporate the Installation's existing demand and energy requirements as well as provide flexibility that may be required to serve additional requirements of the Center, Departments of the Army and Defense. The design will also address the Installation's requirement to incorporate a system or systems necessary to correct the Installation's power factor, should the existing PF Correction Unit not be capable based on design or location.

Design of the new distribution system shall include new secondary copper conductors from the secondary of the new exterior transformers to the existing switchboards at each respective building. As SSC will maintain ownership of these new secondary conductors, SSC shall review and approve the offeror's design (regarding secondary conductors to buildings). Additionally, separate secondary metering shall be provided for each building presently served by the existing 13.8kv distribution system, at each building's respective voltage (208, 480, 2400V).

Additionally, the offeror shall be responsible to perform a coordination study, and short circuit analysis (reviewed and coordinated with SSC) of the new distribution system up to and including the main breaker at each building's secondary switchboard to ensure proper coordination and operation of new and existing system components. This review shall ensure that available fault current at the main breaker of a secondary switchboard shall not exceed existing ratings.

## J1.4 Current Service Arrangement

The Installation currently purchases it electric power requirements from NSTAR under BECO's General Service Rate G-3, which is defined as service to customers metered at 14,000 volts nominal or greater and if the customer furnishes, installs, owns and maintains at his expense all protective devices, transformers and other equipment required by the Company.@ The Army redistributes the electric power from the Installation's two main interconnections with BECO throughout the Main Installation area and facilities utility service areas. The Center's historical electric utility service requirements over the last seven fiscal years are summarized in the following table.

**Summary of SSC's Electric Utility Requirements**

| | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 |
|---|---|---|---|---|---|---|---|
| Peak Demand | 3,053 kW | 3,080 kW | 3,784 kW | 3,977 kW | 3,491 kW | 3,586 kW | 3,957 kW |

Annual Energy 13,957 MWh 15,503 MWh 12,187 MWh 8,389 MWh 12,229 MWh 11,496 MWh 12,204 MWh

Note - FY 1999 is missing the billing information for the months 09/99, 06/99, 12/98 and 10/98.

## J1.5 Secondary Metering

The Installation requires secondary meters at each building (at each respective voltage) for billing of reimbursable customers, utility usage management and energy conservation monitoring. The Offeror shall assume full ownership and responsibility for future secondary meters IAW Paragraph C.3, Future Secondary Meters.

### J1.5.1 Existing and Future Secondary Meters

No existing secondary meters exist that shall be transferred to the Offeror. The offeror will be responsible for the installation of secondary meters at the secondary service to each building.

**TABLE 5**
**FUTURE SECONDARY METERS**

| Meter Location | Meter Description |
|---|---|
| (List to be provided by SSC) | |

## J1.6 Submittals

The Offeror shall provide the Government monthly submittals for the following: Invoice (IAW paragraph G.2). The Offeror's monthly invoice shall be presented in a format proposed by the Offeror and accepted by the Contracting Officer. Invoices shall be submitted by the 25th of each month for the previous month. Invoices shall be submitted to the Contracting Officer or their designee. (This information will be provided upon award)

**Outage Report.** The Offeror's monthly outage report will be prepared in the format proposed by the Offeror and accepted by the Contracting Officer. Outage reports shall include the following information for Scheduled and Unscheduled outages:

- **Scheduled:** Requestor, date, time, duration, facilities affected, feedback provided during outage, outage notification form number, and digging clearance number.

- **Unscheduled:** Include date, time and duration, facilities affected, response time after notification, completion times, feedback provided at time of outage, specific item failure, probability of future failure, long-term fix, and emergency digging clearance number.

Outage reports shall be submitted by the 25th of each month for the previous month. Outage reports shall be submitted to the Contracting Officer or their designee. (This information will be provided upon award)

**Meter Reading Report.** The monthly meter reading report shall show the current and previous month readings for all secondary meters. The Offeror's monthly meter reading report will be prepared in the format proposed by the Offeror and accepted by the Contracting Officer. Meter reading reports shall be submitted by the 15th of each month for the previous month. Meter reading reports shall be submitted to the Contracting Officer or their designee. (This information will be provided upon award)

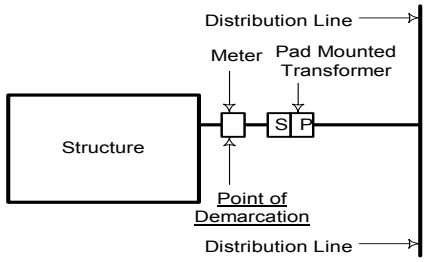
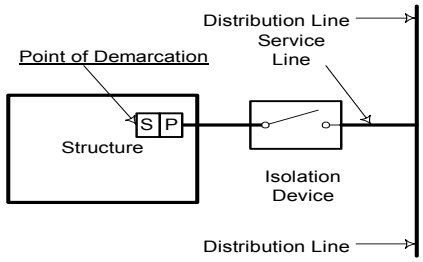
**System Efficiency Report.** If required by Paragraph C.3, the Offeror shall submit a system efficiency report in a format proposed by the Offeror and accepted by the Contracting Officer. System efficiency reports shall be submitted by the 25th of each month for the previous month. System efficiency reports shall be submitted to the Contracting Officer or their designee. (This information will be provided upon award).

## J1.7 Service Area

IAW Paragraph C.4, Service Area, the service area is defined as all areas within the Main Installation boundaries.

## J1.8 Points of Demarcation

The point of demarcation is defined as the point on the distribution system where ownership changes from the Grantee to the building owner. This point of demarcation will typically be at the point the utility enters a building structure or the load side of a transformer within a building structure. During the operation and maintenance transition period, concurrence on specific demarcation points will be documented during the joint inventory of facilities.

| Point of Demarcation | Applicable Scenario | Sketch |
|---|---|---|
| Down current side of the meter | Residential service (less than 200 amps and 240V 1-Phase), and three phase self contained meter installations. Electric Meter exists within five feet of the exterior of the building on an underground secondary line. |  |
| Secondary terminal of the transformer inside of the structure | Transformer located inside of structure and an isolation device is in place with or without a meter<br>Note: Utility Owner must be granted 24-hour access to transformer room. |  |